

Before the  
Federal Communications Commission  
Washington, D.C.

In the Matter of	)	Docket WT 05-235
Notice of Proposed Rule Making	)	
Amendment of Part 97 of FCC Amateur Service	)	
Rules to Eliminate Morse Code Testing	)	

Comments of James P. Miccolis, N2EY

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Introduction

These comments are in response to WT 05-235, to oppose the proposed removal of Morse code license testing in the Amateur Radio Service. These comments also contain an alternative proposal, and a proposed change to Part 97.

I am an electrical engineer with BSEE and MSEE degrees from the University of Pennsylvania and Drexel University, respectively, and am employed full time in the design of control systems for the transportation industry. I am coinventor of US Patent 5,358,202. I am also an active amateur radio operator, first licensed by the Commission in 1967, and currently hold an Amateur Extra class license. My interest in amateur radio at an early age led me to pursue a career in electrical engineering.

I oppose the removal of Morse Code testing, as proposed the NPRM. I also oppose any reduction in Morse Code testing for General or Amateur Extra class licenses. There is no need to eliminate or reduce the current Morse Code test for those licenses in the amateur radio service.

Reasons to Keep Morse Code Testing

While the use of Morse Code has essentially disappeared in other radio services, the mode is widely used by radio amateurs for a variety of purposes, particularly on the HF and MF amateur bands. Morse Code is the second most popular mode used by amateurs on those bands, second only to single sideband voice communication.

An amateur radio license authorizes the licensee to operate only in the amateur radio bands. It logically follows that amateur license requirements should be based primarily on what modes and technologies amateurs actually use on the air, and only secondarily (if at all) on what modes and technologies other services use. The argument that the decline of Morse code use by other services should result in elimination of any Morse code testing for an amateur radio license is faulty.

The amateur radio service is different from other radio services in several ways, such as its noncommercial nature. Its most unique feature is that amateur radio is about radio for its own sake, rather than as a means to an end. Unlike other services, operating skill and technical know-how are fundamental qualities of the radio amateur. Other radio services have long focused on eliminating the need for operator skill and technical competence because those services, unlike amateur radio, are not fundamentally concerned with radio as an end in itself.

Some claim that the Morse Code test acts as a “barrier” to keep “otherwise qualified persons” out of the Amateur Radio service. The Morse Code test is cited as a cause of reduced growth, and filtering out technically qualified persons.

The past 25 years of US amateur radio history tell a different story. Growth in US amateur radio from 1980 to 1990 was virtually identical to that from 1990 to 2000, even though in the former period of time all US amateur licenses required a code test, and there were no medical waivers. The 1990-2000 period saw a surge of growth when the rules were changed, then regression to about the same level of growth that existed before the changes.

The reduction of both written and code license test requirements in 2000 resulted in a surge of upgrades, which has tapered down to levels not much different than before the changes. The total number of US amateurs has declined by about 16,000 in the 66 months since those rules changes took effect. There was an initial increase in the number of licenses, but since mid-2003 the total number of US radio amateurs has declined. It is only logical to conclude that if the code tests were a genuine “barrier”, growth in both total licenses and upgrades would have demonstrated a sustained, dramatic increase. But such sustained increases have not occurred.

In similar manner, the removal of the Morse Code test from the Technician class license has not resulted in a technical revolution in amateur radio from newly-licensed “technically qualified” amateurs. Instead, the continued progress in amateur technical efforts continues to be mostly the result of

work done by experienced amateurs, even though the Technician class license has not had a code test for more than 15 years.

While some other countries have eliminated their Morse Code test requirements for amateur radio licenses, most have not. Those countries which have eliminated the test have not reported dramatic increases in growth.

Many countries still require that those who seek reciprocal licensing hold licenses that require a Morse Code test. Complete elimination of the test would pose a problem for FCC licensed amateurs seeking reciprocal licensing from those countries.

Some claim that Morse Code testing is at odds with the purpose of the amateur radio service as a fundamentally technical service. But in the practical experience of thousands of amateurs, the opposite is true.

Skill in Morse Code, even at a very basic level, permits amateurs to use radio equipment ranging from very simple to highly advanced designs, and technologies of almost any vintage. Morse Code skill encourages amateurs to actually build their own radio equipment by offering an easy first step, and a growth path that leads to almost any usable technology. This simplicity is not limited to older technologies, such as vacuum tubes, but is evident in the wide variety of simple low-power transmitters and transceivers being built and used by amateurs, both as kits and from their own design.

Most radio amateurs are self-trained and do not have access to professional level resources for their amateur radio projects, so such simplicity is very important to supporting the technical knowledge and education of radio amateurs. Few amateurs today would consider a single-sideband voice transceiver as a first project, or even as a second or third project, but the home construction of Morse Code equipment is possible for almost all amateurs. In addition, a new idea can often be readily implemented and tested in a simple Morse Code equipment design, rather than having to deal with the additional complexity of other forms of modulation and demodulation.

I speak from direct experience in amateur radio home construction, having built my first amateur station at age 13. Since then I have built many more projects of increasing complexity, and much of my current amateur radio station is entirely homemade. The construction of my early stations led me to an electrical engineering degree and career. A major factor in that path was being able to start out with very simple but highly effective projects such as a simple Morse Code receiver and transmitter.

Morse Code is one of a very few modes that may be effectively encoded and decoded by either a human operator or a machine system. While voice recognition and synthesis has developed to a good level of performance, it is much more complex than Morse Code, and less tolerant of noise or errors.

Some claim that the Morse Code test acts as some sort of “filter” that produces “quality operators”. Others claim that the Morse Code test has no such effect. It is obvious that no single, one-time test can absolutely guarantee that a licensee will be a “quality operator”. However, a review of the Commission’s enforcement actions shows that amateurs cited for rules violations are overwhelmingly using voice modes when the cited violations are committed. By contrast, enforcement actions against amateurs using Morse Code are extremely rare. The difference cannot be explained by the relative popularity of the various modes. In at least one case, the Commission modified the license privileges of an amateur as the result of an enforcement action so that he was only authorized to use Morse Code on the HF bands.

Morse Code offers a unique combination of spectrum conservation and high performance with simple, low power equipment. While there are other modes that may equal or outperform Morse Code in specific areas, that performance comes at the price of complexity and reduced performance in other areas. For example, the popular mode PSK31 uses less spectrum space than a typical Morse Code signal, and equal or better low-power performance in most situations. But the implementation of PSK31 usually requires a computer for the encoding and decoding, plus a transceiver capable of more frequency stability, low distortion, and linear amplification than required for Morse Code operation.

The current level of Morse Code testing requires only the demonstration of one basic Morse Code skill at 5 words per minute. Those administering the tests have the option to use a wide variety of test methods and accommodations. There are also a wider variety of training methods available for learning Morse Code. It naturally follows that the test is not really an unreasonable requirement for the General and Amateur Extra classes of license.

License examinations should, at the very least, insure that those who pass the examinations have the basic skills and knowledge to do what the license permits. Morse Code is such an integral part of amateur radio HF/MF operation that basic skill and knowledge in its use are a valid requirement for a license to operate on the HF/MF amateur radio bands.

## Morse Code Test for Amateur Extra Only

The ARRL and others have offered the compromise of removing the Morse Code test for General class and retaining it for Amateur Extra. While this compromise is preferable to complete Morse Code test elimination, I recommend the test be retained for General class.

## An Alternative to Complete Elimination of the Morse Code Test: The Canadian Compromise

It is possible that, despite the reasons given here and in other comments, that the Commission will decide that Morse Code testing should not be a stand-alone, pass-fail requirement for a General or Amateur Extra class license. In that event, the following alternative to complete elimination of the Morse Code test is offered.

Most of the debate over Morse Code testing in the USA has been to either completely eliminate or retain Morse Code testing as a mandatory separate requirement for various classes of amateur radio license – an all-or-nothing change. Canada has implemented an innovative compromise solution that retains Morse Code testing yet eliminates it as a mandatory separate test requirement. This solution involves combining the scores of the Morse Code test with those of the written test.

This solution could be adapted to FCC Part 97 rules as follows: The requirements for an upgrade from Technician to General class license would be met by a passing Elements 1 and 3 in the same manner as provided by present regulations, or by passing Element 3 with a grade of at least 85% correct.

This simple change would provide two upgrade paths to the General and Amateur Extra class licenses and eliminate most if not all of the objections to Element 1 as a mandatory requirement. It requires only a minimal rules change and no more administrative work for the FCC or VECs.

All that would be required is for the passing grade for Element 3 to be redefined as either an 85% grade on the written exam, (30 of 35 questions correct) or the existing 74% grade and a passing grade on the Morse Code test (Element 1), and for Element 1 to be removed as a separate requirements for General and Amateur Extra class licenses.

This change would permit all classes of amateur radio license to be earned with or without a Morse Code test, depending upon the choice of the license

applicant. It would also provide compatibility with those countries requiring a Morse Code test for reciprocal licensing.

### Morse-Code-Only Subbands

While the following issue is not strictly part of the test requirements for an amateur radio license, it is presented for consideration because it is connected to the possible effects of Morse Code test elimination.

The modes used by radio amateurs may be divided into two general categories: “manual” modes, meaning those in which a human operator does the decoding and possibly encoding of the signal, and “machine” modes, where both encoding and decoding are done by a machine. A very few modes (such as Morse Code) can be implemented either way.

Morse Code and single-sideband voice are examples of modes usually implemented manually, while PSK31, PACTOR, and WinLink are example of modes implemented purely by machines.

There is a basic incompatibility between “manual” and “machine” modes, because there is usually no way for them to intercommunicate. An amateur using Morse Code or single-sideband voice has no means of communicating with or even identifying a station using a “machine” mode unless that amateur is also equipped to receive and decode the machine modes. This incompatibility will be made worse if the Morse Code test is removed. There are already reports of problems of on-air conflict between “manual” and “machine” modes.

This incompatibility has long been recognized by the Commission, in that most “machine” modes are not allowed in the voice/image subbands of the HF amateur bands. They are only allowed in the non-voice subbands, where they share with Morse Code operation. While Morse Code is allowed almost everywhere on the amateur bands, in practice it is rare for it to be used in the voice/image subbands, except as a backup to voice communications. Morse Code only subbands have long existed on the 6 and 2 meter bands, for similar reasons of incompatibility with voice modes.

I request that FCC rules be changed to create specific “Morse Code only” subbands on the amateur HF/MF bands, amounting to about 15% of the width of each band. The following subbands are suggested to be set aside exclusively for Morse Code use:

1800-1830 kHz

3500-3575 kHz  
7000-7050 kHz  
10100-10110 kHz  
14000-14050 kHz  
18068-18083 kHz  
21000-21050 kHz  
24890-24905 kHz  
28000-28100 kHz

### Conclusion

I strongly recommend that the existing Morse Code test be kept as is. In the event that the Commission decides otherwise, I recommend the above “Canadian compromise” be implemented.

Respectfully submitted,

James P. Miccolis